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The effects of the atomic bomb on Hiroshima, Japan (the secret U.S. Strategic Bombing Survey report 92, Pacific Theatre)

by Nigel B. Cook

Publication date	11 July 2013
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Topics	Nuclear Weapons, Atomic Weapons, Civil Defense, Civil Defence, The effects of the atomic bomb on Hiroshima, The effects of the atomic bomb on Hiroshima, Japan, Strategic Bombing Survey, Capabilities of Nuclear Weapons, Capabilities of Atomic Weapons, Effects of Nuclear Weapons, Scientific Advisory Branch, Home Office, Samuel Glasstone, Philip J. Dolan, George R. Stanbury, Frank H. Pavry, U.S. Strategic Bombing Survey, USSBS, genealogy
Collection	folkscanomy_politics; folkscanomy; additional_collections
Language	English

The effects of the atomic bomb on Hiroshima, Japan, 1947

U.S. Strategic Bombing Survey secret Pacific Theatre report number 92, with added relevant declassified research on nuclear weapons testing effects and scientific research on civil defense against other threats.

Discussion: www.glasstone.blogspot.com

The Effects of the Atomic Bomb on Hiroshima, Japan, secret, unpublished three-volume May 1947 report

The 14 October to 26 November 1945 U.S. Strategic Bombing Survey of Hiroshima is the key compendium of data, with much more data than any nuclear test report from the 1950s. A 1946 British Mission to Japan report includes photographs of air raid shelters which survived near ground zero in Hiroshima and Nagasaki, but gives the survival data of 15,000 school children (in teams clearing firebreaks mainly outdoors), without stating the survival rates inside modern buildings. This is also done in Manhattan District report on Hiroshima and Nagasaki, and in the 1950-77 editions of The Effects of Atomic Weapons and The Effects of Nuclear Weapons where no breakdown of survival data in different kinds of buildings and in the open is provided. In particular, the cause of the Hiroshima firestorm was determined by the U.S. Strategic Bombing Survey in its secret May 1947 report, but this was omitted from publications such as its unclassified report and the book, The Effects of Atomic Weapons.

Beginning with an incendiary raid on Tokyo on 9 March 1945 which Japanese records showed killed 83,793 and burned out 267,000 buildings (25% of Tokyo's buildings), sixty-four Japanese cities were destroyed by non-nuclear air raids. The detailed and objective analysis of these incendiary air raids was

classified “Restricted” in April 1947 by the U.S. Strategic Bombing Survey in its unpublished limited distribution typeset and printed report Number 90, Effects of Incendiary Bomb Attacks on Japan; Part 3 (pages 65-118) documents the effects of the 9 March 1945 Tokyo incendiary raid, with photos on pages 104-109 very similar to the damage in Hiroshima and Nagasaki (combustible light frame buildings burned out with their steel distorted by the fires, and piles of charred bodies in streets). By omitting to publish this, an objective comparison of nuclear with conventional attacks was prevented.

The Effects of the Atomic Bomb on Hiroshima, Japan, USSBS report 92, volume 2 (typeset May 1947 edition, secret)

Volume one, page 14: “the city lacked buildings with fire-protective features such as automatic fire doors and automatic sprinkler systems”, and pages 26-28 state the heat flash in Hiroshima was only “capable of starting primary fires in exposed, easily combustible materials such as dark cloth, thin paper, or dry rotted wood exposed to direct radiation at distances usually within 4,000 feet of the point of detonation (AZ).” Page 85 of volume one explains why so many people were outdoors in Hiroshima at 8:15 on 6 August 1945:

“Conditions on Morning of Attack. The morning of 6 August 1945 was clear with a small amount of clouds at high altitude. Wind was from the south with a velocity of about 4.5 miles per hour. Visibility was 10 to 15 miles. An air-raid ‘alert’ was sounded throughout Hiroshima Prefecture at 0709 hours [the weather survey B-29 aircraft flying one hour ahead of the nuclear bomber]. ‘All-clear’ was sounded at 0731 hours. The following circumstances account in part for the high number of casualties resulting from the atomic bomb:

(1) Only a few persons remained in the air-raid shelters after the ‘all-clear’ sounded.

(2) No ‘alert’ was sounded to announce the approach of the planes involved in the atomic-bomb attack.

(3) The explosion occurred during the morning rush hours when people had just arrived at work or were hurrying to their places of business. This concentrated the population in the center of the city ...”

Volume two examines the ignition of clothing by the thermal radiation flash in Hiroshima:

Page 24: “Scores of persons throughout all sections of the city were questioned concerning the ignition of clothing by the flash from the bomb. ... Ten school boys were located during the study who had been in school yards about 6,200 feet east and 7,000 feet west, respectively, from AZ [air zero]. These boys had flash burns on the portions of their faces which had been directly exposed to rays of the bomb. The boys’ stories were consistent to the effect that their clothing, apparently of cotton materials, ‘smoked,’ but did not burst into flame. ... a boy’s coat ... started to smoulder from heat rays at 3,800 feet from AZ.”

Page 28: “Wood poles as far as 10,000 feet in a southerly direction from AZ [air zero] and 13,000 feet in a northerly direction were flash-burned but the burns, generally not much more than a discoloration of the wood, were in all cases only on the side of the pole facing AZ. ... it is logical to conclude that wood (ignition temperature approximately 450 F) was not raised to its ignition temperature, except possibly in its most easily ignitable condition, such as dry-rotted. Surface spalling or roughening of granite by heat was observed near GZ and as far as 2,400 feet from AZ. This condition was only noticeable where the granite was directly exposed to rays from the bomb (surfaces facing AZ but shielded from it were not spalled) indicating that extremely high temperatures lasted only a fraction of a second. Asphalt road surfaces and asphalt-painted surfaces also were flash-burned, distinct shadows of objects being cast upon them, which again indicated that the radiated heat from the bomb created a temperature which was high but of short duration. ... Blisters as much as one-sixteenth inch high were raised on exposed tile at GZ (2,000 feet

from AZ), decreasing in size as the distance from AZ increased until they were barely visible at 4,400 feet from AZ (4,000 feet from GZ)."

Page 34: "The fire wind seems to have reached its maximum velocity about 2 to 3 hours after the bomb explosion, following which it began to diminish in intensity. ... the heavier rain began about 3,500 feet west of GZ and extended westward about 5,000 feet. Light rain was reported to have fallen near the center of the city. ... Rain fell almost exclusively in the northwest area of the city ... accounted for by the light natural wind from the southeast which blew particles of hot carbon northwestward to a cooler area where moisture condensed about them and fell as rain."

Page 44: "A special effort was made to determine the probable cause of initial ignition in buildings in which there was fire and the reason for non-ignition in buildings in which there was no fire. By observation and by interrogation of persons who were in or near the buildings when the bomb detonated it was established that the probable causes of initial ignition in 40 of the 58 fire-resistive [not wood frame] buildings in which there was fire were as follows: 8 by heat radiation from the bomb (primary fire); 3 by blast disturbance of telephone or chemical laboratory equipment (secondary fire); and 29 by fire spread from exposing buildings."

Page 45: "Direct Ignition by the Atomic Bomb. ...

"(1) Each of the eight fire-resistive buildings in which primary fire was reported had unprotected windows facing AZ. Black cotton black-out curtains or light-weight paper, or both, were reported to have ignited initially in most of these buildings. All buildings in Hiroshima whose windows were not equipped with steel-roller shutters, which were considered light-proof, were required to have black-out curtains. Among the eight buildings which had primary fires, the farthest from AZ was Building 64 [Hiroshima Communications Hospital] at 5,300 feet [from AZ, or 4,900 feet from GZ].

"(2) A doctor who was in the first story of Building 64, a hospital 5,300 feet from AZ, stated that he discovered fire in the second story 10 minutes after the detonation, but was unable to identify the source. ... Cotton black-out curtains were drawn across the second-story windows only. ... Contents in the second story were totally damaged by fire, but in the first story only a few pieces of wooden furniture near the windows in the south wall facing AZ were scorched ..."

Page 70: "Direct Ignition by the Atomic Bomb. None of the 8 non-combustible buildings which had [contents] fire in them was reported to have had its contents ignited by radiated heat from the bomb. All except 3 (Buildings 46, 78, and 81) of the 12 non-combustible buildings had at least some unprotected wall openings facing AZ at the time of detonation of the bomb. The contents of these 3 buildings were shielded from direct radiated heat from the bomb by a blank wall, closed fire shutters, or another building. ...

Pages 74-75: "Combustible Construction. a. General. ... combustible buildings were load-bearing, brick-wall structures with wooden floors or roof, or both; steel-frame structures with wooden purlins and studs ... It was established that the probable cause of initial ignition in 23 of the 41 buildings which had fire was as follows: 3 by secondary fire (electrical equipment, stoves and industrial furnaces), and 20 by fire spread from exposing buildings. ... No eyewitness testimony was obtained to the effect that any one of the 41 fire-damaged combustible buildings was ignited directly by flash heat from the bomb.

"b. Direct Ignition by the Atomic Bomb. Although none of the 41 fire-damaged combustible buildings was reported to have been ignited by radiated heat from the bomb, it is considered probable that the contents of a few of the buildings which had unshielded wall openings facing AZ and which were within 4,000 feet of AZ were ignited in this manner. Since wooden poles and other exposed wood, even near GZ, were only flash burned by the bomb, it seems unlikely that exposed wood outside or inside buildings was ignited directly. ...

“c. Ignition by Secondary Fire. It was established that the initial ignition in three combustible buildings (3 [Hiroshima Electric Company’s Yagurashita Substation 900 feet from GZ], 37 [Takano Bath House 4,200 feet from GZ], and 72 [Toyo Light Alloy Company 6,200 feet from GZ]) was probably by secondary fire. These comprise 13 percent of the cases in which the probable cause was determined in this class of building. Building 3, an electric substation, was ignited by short circuits in electric generating and transforming equipment after the blast had collapsed the combustible roof. ... Building 37, a public bath house, was ignited by a hot stove after the blast had collapsed the combustible roof so that it fell on the stove. The combustible debris and contents were completely consumed. Building 72, an aluminum foundry, was ignited by a hot stove ...”

Page 88: “Ignition of the City. ... Only directly exposed surfaces were flash burned. Measured from GZ, flash burns on wood poles were observed at 13,000 feet, granite was roughened or spalled by heat at 1,300 feet, and vitreous tiles on roofs were blistered at 4,000 feet. ... six persons who had been in reinforced-concrete buildings within 3,200 feet of air zero stated that black cotton blackout curtains were ignited by radiant heat ... dark clothing was scorched and, in some cases, reported to have burst into flame from flash heat [although as the 1946 USSBS report admits, most immediately beat the flames out with their hands without sustaining injury, because the clothing was not drenched in gasoline, unlike peacetime gasoline tanker road accident victims] ... but a large proportion of over 1,000 persons questioned was in agreement that a great majority of the original fires was started by debris falling on kitchen charcoal fires, by industrial process fires, or by electric short circuits. Hundreds of fires were reported to have started in the centre of the city within 10 minutes after the explosion. Of the total number of buildings investigated [135 buildings are listed] 107 caught fire, and in 69 instances, the probable cause of initial ignition of the buildings or their contents was as follows: (1) 8 by direct radiated heat from the bomb (primary fire), (2) 8 by secondary sources, and (3) 53 by fire spread from exposed [wooden] buildings.”

Page 110: “The most common failure of wood-frame buildings was buckling of the relatively slender columns ... This resulted usually either from a mass displacement of the building away from the blast, or from panel walls being blown in and carrying the columns along.”

Pages 126-8: “Structural damage by blast to multistory, steel- and reinforced concrete-frame structures did not extend beyond 2,000 feet from GZ. The buildings within this radius sustained an average of 12 percent structural damage. The average for all the buildings of this type in Hiroshima was 8 percent.”

Page 96 gives the mean destructive distance for multistory steel and reinforced concrete frame (both earthquake and non-earthquake resistant) buildings at 700 feet, compared to 9,200 feet for Japanese (wood-pole constructed) wooden houses. The damaged areas are proportional to the square of the radius, so although the Japanese wooden houses were only destroyed out to a radius about 13 times greater than modern city buildings, they were destroyed over an that was 173 times greater. Thus, for a similar bomb yield and altitude, the number of damaged buildings in a modern city would be 173 times less than in Hiroshima on 6 August 1945.

Page 126 states that the effects would have been stronger near ground zero for a lower burst height, but “lowering the height of detonation would have increased the amount of shielding of one structure by another”, thereby preventing the wide-area Mach stem enhanced blast and thermal effects like flash burns. Penney published extensive evidence of blast wave attenuation by the work energy done in causing damage (the force F due to a blast pushing a wall distance D in the direction of the blast uses energy E = FD, so energy is continually lost from the blast wave in a city, in doing damage).

Although fashionable books on Hiroshima tend to print pictures of the “blasted” twisted metal beams of the Odamasa Store (former Taiyo Theatre), USSBS building 52 at 2,800 feet from ground zero, page 322 explains it is an effect of fire: “Severe distortion caused by burning of combustible construction and con-

tents." Furthermore, similar twisting of metal frames in wooden buildings occurred in the Toyko incendiary attack, but those photos remained Restricted. It is not a special "nuclear" effect, nor are the burned bodies in the streets of Tokyo photographed after the main non-nuclear attack, despite all the polemic and inaccurate claims attacking civil defense.

Volume three states on page 29:

"The atomic bomb detonated at Hiroshima, although it was an extremely powerful blast weapon, caused relatively little structural damage to the 81 important bridges. Scattered throughout the entire city, the bridges, 260 to 15,600 feet from ground zero (GZ), connected islands to islands and islands to the mainland, forming an adequate and efficient bridge system. ... impressive evidence of the ability of the bridges to resist the forces of the Hiroshima atomic bomb (air-burst at 2,000 feet0 was found in the facts that (1) 10 of 19 timber bridges studied were undamaged, (2) 10 of 15 concrete bridges had no damage, and (3) 14 of 23 steel bridges were undamaged."

This is illustrated by the survival of the nuclear target point, the distinctive T-shaped Aioi bridge at the intersection of the Ota and Motoyasu Rivers (located 1,000 feet from ground zero due to the Hiroshima bombing error). Volume three at page 40 explains: "This bridge of plate-girder design received physical damage of a spectacular and interesting nature but it continued to carry unrestricted highway, pedestrian, and street railway traffic. The longitudinal steel girders suffered no great structural damage although a slight lateral deformation indicated that they had been highly stressed." Bridge 20 over the Motoyasu River at 2,900 feet from ground zero retained clear "shadows" of non-scorched asphalt cast by the hand railings, one of the pieces of evidence which allowed geometric determination of the burst location and altitude.

EMP effects in Hiroshima may have been masked by blast and fire damage, as indicated in volume three, pages 191-6: "Of the 7 substations of the Chugoku Electric Co., the Sendamachi substation and steam-electric plant at 7,700 feet from GZ were heavily damaged by fires which spread to the area. The Otemachi substation, 2,400 feet from GZ, was heavily damaged by blast and fires started by the short-circuited equipment. The Dambara, Misasa, and Eba substations were only slightly damaged at distances from GZ of 5,500 feet and beyond. ... Analysis of the Damage. The Hiroshima substation, 15,000 feet from GZ, was undamaged by blast as a direct effect, but the tremendous overload created by the short-circuited damaged electrical equipment in the city of Hiroshima tripped the circuit breakers in the substation and immediately interrupted all electrical services in the Hiroshima area."

The reason why there is statistically reliable data on high doses of radiation from Hiroshima and Nagasaki is simply the fact that people - far from being instantly vaporized along with all buildings near ground zero - survived all of the nuclear explosion effects within the Hiroshima firestorm. This occurred for example in the Bank of Japan and in Geibi Bank Company, where survivors extinguished fires 2-3 hours after the nuclear explosion. In these cases, firebrands (burning cinders) were blown through broken windows from the firestorm in wooden areas surrounding these modern concrete city buildings.

The U.S. Department of Defense's 1973 "DCPA Attack Environment Manual", chapter 3, panel 26 used the examples of successful amateur fire-fighting modern Western-type city buildings in Hiroshima as proof that people can survive in modern city buildings exposed near ground zero within the firestorm of a nuclear explosion (due to overcrowded wooden housing areas). The data came from reports which remained limited or secret in distribution, however. Panel 27 in chapter 3 of the 1973 DCPA Attack Environment Manual states:

"The evidence from Hiroshima indicates that blast survivors, both injured and uninjured, in buildings later comsumed by fire were generally able to move to safe areas following the explosion. Of 130 major buildings studied by the U.S. Strategic Bombing Survey ... 107 were ultimately burned out ... Of those suffering

fire, about 20 percent were burning within the first half hour. The remainder were consumed by fire spread, some as late as 15 hours after the blast."

This proves that the rapid room flashover filmed in Upshot-Knothole Encore test for one a litter-filled wooden and inflammable materials-filled room with a large window in 19% humidity dry Nevada desert conditions, facing the fireball with no obstructions or skyline "shadowing", did not occur in the 80% humidity conditions of Hiroshima, far higher than in the drier Nevada test site desert (the humidity in Hiroshima was 80% and in Nagasaki it was 71%, see table VI of William E. Loewe, Lawrence Livermore National Laboratory report UCRL-90258, 1983).

Although humidity has relatively little effect on the ignition energy for thin fine kindling materials, the proportionate effect is far greater for thicker fuels with the same equilibrium moisture content. The thermal flash can dry out damp paper; but it cannot dry out damp wood (a maximum of 0.85 mm of the surface of wood was charred by 50 cal/sq cm from a 30 kt test in 1955 as proved by Kyle Laughlin in nuclear weapon test report WT-1198, 1957). Therefore, rapid flashover does not occur in realistic city humidity (most cities are beside rivers, lakes or the ocean). It did not occur from thermal radiation in Hiroshima.

Nine survivors of Hiroshima who travelled to Nagasaki avoided blasted glass and flying debris at the second nuclear explosion because they knew that the blast effect (breaking windows and blasting glass fragments and other debris horizontally) was slightly delayed after the flash (like thunder after lightning), so they had time to literally duck and cover from part of the heat flash and horizontally flying glass and debris. Robert Trumbull - the New York Times Pacific and Asia war correspondent, 1941-79 who had been in Iwo Jima - documented the facts in his 1957 book Nine Who Survived Hiroshima and Nagasaki: Personal Experiences of Nine Men who Lived Through Both Atomic Bombings. Here are their experiences and ages on 9 August 1945:

Kenshi Hirata, 26, accountant at Mitsubishi Shipbuilding Company, Hiroshima (Trumbull pp. 25, 61, and 119): "'through an open window what looked like a golden lightning flash ... had blown up out of the earth. The weird light was everywhere. I immediately thought of an air-raid, and hurled myself prostrate in the passage.' Hirata's quick action probably saved him serious injury, if not his life. ... Because it was the middle of summer, which is exceptionally hot in southern Japan, most of the people of Hiroshima were very thinly clad that morning, so they had less than ordinary protection against burns, Hirata observed. ... [Back in Nagasaki] 'I shouted to my aged father ... 'Lie face downward!' In the immediate moment I was expecting that terrific explosion blast and roar.' ... Kenshi and his father were unharmed. 'But in two or three minutes ... I saw people running out of their houses, holding their hands over injuries on their heads, faces, and bodies. Most of these were wounds caused by flying pieces of glass."

Tsutomu Yamaguchi, 29, Mitsubishi ship designer who died in 2010, aged 93 (Trumbull pp. 28 and 109): "'Suddenly there was a flash like the lighting of a huge magnesium flare,' Yamaguchi recalls. The young ship designer was so well drilled in air-raid precaution techniques that he reacted automatically ... he dropped to the ground, face down. ... 'As I prostrated myself, there came a terrific explosion' ... [The left side of his face and arm facing the fireball were burned, and he returned to Nagasaki, experiencing the second nuclear explosion on the sixth-floor of the headquarters office of Mitsubishi.] Spelling out the danger of flying glass, he urged them to keep windows open during an air-raid alert, and at the instant of the flash to seize at once upon any shelter available ... the second A-bomb confirmed young Yamaguchi's words, exploding in a huge ball of fire about a mile away. Yamaguchi's lecture ... was not lost upon his colleagues. With the young designer's words still fresh in their minds, they leaped for the cover of desks and tables. 'As a result,' said Yamaguchi, 'my section staff suffered the least in that building. In other sections there was a heavy toll of serious injuries from flying glass'."

Shigeyoshi Morimoto, 46, maker of kites for air defense of Japanese ships, used his Hiroshima experience to take cover in Nagasaki after seeing the flash, before the windows were blasted in. Tsuitaro Doi,

47, was on his Hiroshima hotel bed, a thin floor mattress called a “futon” when he saw the explosion flash (Trumbull pages 42 and 106-7): “I quickly rolled over and covered my head with the futon ... The floor of the room and my futon were covered with tiny bits of shattered glass. I noticed that I had a slight cut on one arm, and another on the leg, where I wasn’t covered. ... [He returned home to Nagasaki] “Doi was telling his wife in detail about the bomb. ‘If you ever see that flash,’ he said, ‘immediately prostrate yourself on the floor, or the ground if you are outside. ...’ As he was saying these words, the windows lighted as if giant searchlights had been turned directly into the house. ... Mrs Doi startled, jumped to her feet impulsively and turned to run out of the house. Doi grabbed her and pulled her and the baby down as the blast wave shattered all the glass in the little cottage and ripped off the wood and paper sliding doors. As the flimsy house steadied Doi opened his eyes, and saw that the interior of the room was a wreck. But neither he nor his wife nor the baby was hurt.”

Shinji Kinoshita, 50, was hit by falling roof slabs in a Hiroshima warehouse but returned home to Nagasaki and was just outside the door of his family home when the bomb fell (Trumbull p105): “he was momentarily blinded by a flash that seemed to cover the sky. Like the other survivors of the Hiroshima attack, Kinoshita realized at once what the strange, blinding light meant, and reacted without a second’s hesitation. He threw himself face first on the ground, at the same time shouting into the house, ‘Cover yourself with futons!’”

Masao Komatsu, 40, was hit by falling beam in a Hiroshima warehouse and was on board a train in Nagasaki when the bomb fell (Trumbull, p101): “the interior of the coach was bathed in a stark, white light. Komatsu immediately dived for the floor. ‘Get down!’ he screamed at the other passengers. Some recovered sufficiently from the daze of the blinding light to react promptly to his warning. Seconds later came the deafening crack of the blast, and a shock wave that splintered all the windows on both sides of the train. The passengers who had not dived under the seats were slashed mercilessly from waist to head by glass flying at bullet speed.”

Takejiro Nishioka, 55, publisher of Nagasaki’s leading newspaper in 1945 who became Governor of the Nagasaki Prefecture in 1957. In Hiroshima on business on 6 August 1945, he survived the first nuclear explosion and noted the delay of the blast wave after the visible flash. When he returned to Nagasaki he was not allowed to publish the facts, and only survived by diving into an air raid shelter when he saw the flash after a single B-29 appeared over the city. He explained (Trumbull, p92):

“I had observed in Hiroshima that when the flash came, there would be a few seconds before it was followed by the blast wave ... I have often bitterly regretted the law that gagged me as a newspaperman, and forced me to confine my communications to the governor’s ear alone.”

Japan only permitted civil defense advice against nuclear attack to be published after the second nuclear attack on Nagasaki, which was too late. Even at ground zero, the blast wave was delayed after the first flash because of the height of burst, so quick reactions could limit exposure to flying glass. Proof of the efficiency of duck and cover advice against the blast wind and flying debris was given by Nagasaki’s police chief Mizuguchi, who had been told Nishioka’s advice by the Nagasaki governor and had passed it to his first-grade middle school student son, who was with three friends in Daikoku-Machi street, Nagasaki, when the flash occurred (Trumbull pp. 114-5):

“The police chief’s son remembered his father’s warning at once. Hauling his friend with him by the hand, he dashed for a shelter on the pavement ... The two boys in the shelter were saved; the other two, who stayed on the street, seemed to vanish ... Mizuguchi’s wife, at the same moment, happened to be standing just outside their house, under the eves, with a baby in her arms. The instant she saw the flash, she recalled her husband’s words of the night before and rushed back into the house. She opened a closet and, with the baby still in her arms, crowded inside and pulled shut the sliding door. ... The room, and the area outside the house, was covered with innumerable sharp, pointed slivers of shattered glass. Clearly,

she had escaped serious injury by shutting herself in the closet. ...

“Nishioka was bitterly upbraided by Hiromasa Nakamura, chief of the foreign affairs sections of the Nagasaki Prefectural Office, for not briefing other government officials on the happenings at Hiroshima and the efficacy of bomb shelters. ... ‘I could only tell him that I was indeed anxious to tell everyone in Nagasaki what I had learned, but that if I had done so, I would have been liable for violation of the law against spreading ‘wild rumors’, and could have been arrested and convicted.”

Akira Iwanaga (25, engineer at Mitsubishi ship yard, a friend and colleague of Yamaguchi). After surviving at Hiroshima, he arrived in Nagasaki just as the bomb exploded, aboard the same train as another double-survivor, Masao Komatsu (Trumbull p101). Sakajiro Mishima, 36, dockside worker at Mitsubishi ship yard, also survived both nuclear explosions. Yamaguchi’s friend Kuniyoshi Sato, along with Masako Suga and her baby boy and Hiroshi Shibuta were all also double-survivors of both Hiroshima and Nagasaki. Another double-survivor is Mrs Kazuko Sadamaru (aged 20 in 1945), who was interviewed aged 80 in 2005 in The Observer (London, Sunday 24 July 2005). She was a nurse in a Nagasaki’s Ohmura Naval Hospital but on 5 August 1945 had to accompany a soldier to Hiroshima by train, where she survived and returned to Nagasaki before the second bomb:

‘“I never wanted to speak out about my experience. I haven’t published anything or talked to anyone because I didn’t want anyone to know. I only became a nurse because I wanted to devote myself to patients and the country. I never dreamt Japan would lose the war. I worked and worked believing Japan would win. I cannot forget the events on 6 and 9 August 1945. I saw the flashes and the mushroom clouds of both A-bombs dropped on Hiroshima and Nagasaki. So many were exposed to the A-bomb but I am one of the few people who have experienced the two bombs, and still I am in good health. It was fate that I was there, but I had good luck in that I survived both bombs.” Despite being close to both bombs, she suffered only a temporary abnormal white blood cell count and loss of hair.”’

“No statistically significant increase in major birth defects or other untoward pregnancy outcomes was seen among children of survivors. ... The incidence of major birth defects (594 cases or 0.91%) among the 65,431 registered pregnancy terminations for which parents were not biologically related accords well with a large series of contemporary Japanese births at the Tokyo Red Cross Maternity Hospital, where radiation exposure was not involved and overall malformation frequency was 0.92%. No untoward outcome showed any relation to parental radiation dose or exposure. ... Since many birth defects, especially congenital heart disease, are not detected in the neonatal period, repeat examinations were conducted at age eight to ten months. Among the 18,876 children re-examined at that age, 378 had one or more major birth defect (2.00%), compared with 0.97% within two weeks of birth. Again, there was no evidence of relationships to radiation dose.”

– RERF, Birth defects among the children of atomic-bomb survivors (Hiroshima and Nagasaki nuclear weapons explosion irradiated survivors).

The Hiroshima-Nagasaki nuclear attacks RERF life-span study (LSS) from 1950 to 2000 for leukemia deaths and from 1958 to 1998 for solid cancer occurrence showed that for 49,204 survivors in the leukemia study group, there were an excess of 94 leukemia deaths attributed to radiation, risk of 94/49,204 or 0.191% (above the natural number of cancers in the unexposed control group), and an excess of 848 solid (tumour) cancer deaths in 44,635 survivors, a risk of 848/44,635 or 1.90%. In each case, the excess radiation cancer risk was smaller than the natural risk of 0.22% for leukemia and 15.69% for solid (tumour) cancer deaths. It is significant that the natural cancer death risk was higher than the radiation cancer death risk for both leukemia and solid tumours unless the dose exceeded about 1 Gray (100 R or 100 cGy). E.g., 48% of leukemia deaths from doses of 10-100 R were due to radiation and 52% were natural (a bigger risk than radiation). Likewise, only 16% of solid tumour cancer deaths for doses of 10-100 R were due to radiation (84% were natural).

“If all residents in the hazardous fallout region adopt a shelter-in-place strategy, the total number of acute radiation casualties is estimated to be ~ 3,600, as compared to ~ 100,000 casualties if all are outdoors and unsheltered. Some further reductions in casualties can be realized if those in the poorest shelters transit to better shelters soon after the detonation.”

– Larry D. Brandt and Ann S. Yoshimura, Analysis of Sheltering and Evacuation Strategies for a Chicago Nuclear Detonation Scenario, Sandia National Laboratories, Report SAND2011-6720, August 2011, page 5. (PDF here.)

“We have shown that common estimates of weapon effects that calculate a ‘radius’ for thermal radiation are clearly misleading for surface bursts in urban environments. In many cases only a few unshadowed vertical surfaces, a small fraction of the area within a thermal damage radius, receive the expected heat flux.”

– R. E. Marrs, W. C. Moss, and B. Whitlock, Thermal Radiation from Nuclear Detonations in Urban Environments, Lawrence Livermore National Laboratory, UCRL-TR-231593, June 2007, page 11. (PDF here.)

“Reliance on The Effects of Nuclear Weapons for valid conclusions has its shortcomings. For example, in the 1954 test series in the Pacific, I was on the deck of the YAG-39 which was on station at about twenty miles from the shot point of a detonation with a yield near ten megatons. The thermal flash did not produce the predicted second degree burn on the back of my neck or indeed any discomfort at all.”

- Dr Carl F. Miller, Dialogue, Scientist and Citizen, vol. 8, combined issues 4-5 (February-March 1966), page 17.

“Models developed at Applied Research Associates (ARA) and Los Alamos National Laboratory have shown similar reductions in injuries from the initial radiation [J.T. Goorley, Nuclear Weapon Effects for Urban Consequences, Los Alamos National Laboratory, LA-UR 09-00703 and LA-UR-10-01029] ... Like the thermal analysis, these studies indicate that the ambient radiation levels from a low-yield, ground-level nuclear detonation in an urban environment could be significantly reduced.”

– Brooke Buddemeier, “Reducing the Consequences of a Nuclear Detonation: Recent Research”, The bridge (ISSN 0737-6278, National Academy of Engineering), Vol. 40, No. 2, Summer 2010, pp. 28–38 (quotation from page 30).

After studying hundreds of Hiroshima and Nagasaki survivors, Dr. Irving L. Janis reported that the bright flash arriving at light speed ahead of the blast wave allowed them to take evasive action in Hiroshima and Nagasaki, a fact ignored in computer models of blast casualties (Psychological Effects of Atomic Bombing, Industrial College of the Armed Forces, Publication No. L54-134, 14 May 1954, page 4):

“A substantial proportion of the survivors reacted automatically to the brilliant flash of the A-bomb as a danger signal, even though they knew nothing about the existence of atomic weapons at that time. Some who were not located near ground zero took prompt action – such as falling to a prone position – which minimized exposure to the blast and to the secondary heat waves. In many other cases, however, the opportunity to minimize the danger was missed because the individual remained fixed or because the action which was taken proved to be inappropriate.”

Dr G. Andrew Mickley explains how workers who returned to Nagasaki after surviving at Hiroshima were able to use their experience to survive the second nuclear explosion, and to help others to prepare, in his paper “Psychological Factors in Nuclear Warfare”, Chapter 8 in Textbook of Military Medicine; Part I,

Warfare, Weaponry, and the Casualty; Volume 2: Medical Consequences of Nuclear Warfare, U.S. Army, 1989, pp. 184-5:

“The benefits of training are confirmed by the remarkable experiences of nine persons who survived the Hiroshima bombing and then fled to Nagasaki in time for the second atomic bomb. They remembered very well what they had done that allowed them to live, and they quickly instructed others in Nagasaki: “Yamaguchi's lecture on A-bomb precautions, he pointed out later, was not lost upon his colleagues. With the young designer's words still fresh in their minds [on 9 August 1945, in Nagasaki] they leaped for the cover of desks and tables. “As a result,” said Yamaguchi, “my section staff suffered the least in that building. In other sections there was a heavy toll of serious injuries from flying glass.” (Quoted from Robert Trumbull, Nine who survived Hiroshima and Nagasaki, New York: E. P. Dutton and Co., 1957.)”

Robert Trumbull’s Nine who survived Hiroshima and Nagasaki (E. P. Dutton and Co., N.Y., 1957) interviewed nine of the sixteen who survived both the Hiroshima and Nagasaki nuclear explosions (travelling to homes in Nagasaki immediately by train after surviving at Hiroshima). The double-survivor Takejira Nishioka (a newspaper publisher) observed in Hiroshima that the blast wave was delayed after the flash, and, being friends with the Governor of Nagasaki Prefecture, tried (but failed) to get permission to send out a warning prior to the Nagasaki nuclear attack that people can avoid being knocked down or hit by horizontally-blasted window glass and debris if they duck and cover on seeing the very bright visible flash. Duck and cover also provides shielding from thermal and nuclear radiation, because it increases the fraction of the free-field air radiation dose which is attenuated through obstructions before reaching a person, as was known in 1949 (HO 225/14, The advantage of lying prone in reducing the dose of gamma rays from an airburst atomic bomb).

The advice was experimentally verified in the 37 kt Plumbbob-Priscilla nuclear test of 1957, where a standing dummy and a lying dummy were actually filmed being hit by a 5.3 psi peak overpressure blast wave. The lying dummy was completely unmoved, but the standing dummy was accelerated to 21 ft/s in just 0.5 seconds, and blasted a distance of 22 feet. However, in humans the feet rotate forward (because the centre of the body mass is above mid-height) so head-first impacts at the maximum velocity are prevented by the laws of physics, and the only risk to the head is from the vertical fall, and even this is delayed for the blast duration, giving at least 0.5 second of extra time to use the arms to protect the head. Even in the 43.7 kt Plumbbob-Smoky nuclear test where the dummies were in a “blast precursor” desert sandstorm with a very much high dynamic pressure, the lying dummy was only blown half the distance of the standing one. In 1964, the 0.5 kt Snowball explosion confirmed the data and showed that goats are a proxy for humans in translation experiments (DASA-1859). Experiments prove that 77% (23/30) of goats survived a blast which gave them a velocity of 51-78 ft/sec and a decelerative tumbling displacement of 59-151 ft (I. G. Bowen, D. R. Richmond and C. S. White, Translational Effects of Blast Waves, “Minutes of the Tripartite Technical Cooperation Program, Panel N-1, Sub-group N, 14-16 March 1963”, Lovelace Foundation for Medical Education and Research, 11 March 1963, page 57). In a built-up area, most people will never even reach the peak velocity observed in desert tests, because they will be stopped by obstructions after typically 10 ft, before they have even been accelerated to the optimum velocity. Therefore, any injury will be less serious, due to the smaller velocity at the time of impact.

On 27 September 1956 dummy men were exposed to the 15 kt Buffalo-1 nuclear test at Maralinga (similar yield to Hiroshima). Dummies standing facing the burst were blown ~0.35ppsi2 feet (p = peak overpressure, psi). But the dummies lying facing radially towards or away from ground zero were only blown 10% of this distance, because of (1) the smaller area exposed to the blast wind and dust, and (2) the greater area in contact with the ground, providing frictional resistance against drag. References: W. J. H. Butterfield, E. G. Hardy and E. R. Drake Seager, The effects of blast on dummy men exposed in the open, Operation Buffalo, Atomic Weapons Research Establishment, report AWRE-T2/59, 1959 National Archives documents DEFE 16/165, A. R. F. Martin, The effects of blast on dummies and scout cars, Operation Antler, report AWRE-T6/59, ES 5/270, 1959, and the research on the reduced blast displace-

ment of lying dummies exposed to large conventional explosions: DASA 2710.

Professor Freeman Dyson debunked the popular myths in his 1985 book Weapons and Hope (Harper and Row, New York, pp. 33-41):

“In 1957 ... Nevil Shute Norway published On the Beach, a description of mankind wiped out by radiological warfare [he had also previously published guesswork speculations about war in Britain in his April 1939 novel, What Happened to the Corbetts, which incorrectly speculated that bombing would cause a lack of clean water and cause that diseases like cholera to spread]. Norway's poignant translation of apocalyptic disaster into the everyday voices of real people caught the imagination of the world. His book became an international best-seller and was made into a successful film. The book and the film created an enduring myth, a myth which entered consciously or subconsciously into all subsequent thinking about nuclear war. ... Almost all the details are wrong: radioactive cobalt would not substantially increase the lethality of large hydrogen bombs; fallout would not descend uniformly over large areas but would fall sporadically in space and time; people could protect themselves from the radioactivity ...

“The first generation of hydrogen bombs which were tested in 1952 and 1954 had yields running from ten to fifteen megatons. They were, from a modern point of view, absurdly and inconveniently large. ... By the time I paid my first visit to Los Alamos, in the summer of 1956, hydrogen bombs of the twenty-megaton class were already considered technologically obsolete; all the experts I spoke to were working on smaller bombs with lower yields. ... The race toward smaller bombs has been driven by ... the cruise missile and the MIRV (Multiple Independently-targeted Reentry Vehicle). ... As soon as cruise missiles and MIRVs are available, high-yield weapons rapidly become obsolete. ... The central paradox of the arms race is the discrepancy between public perception and reality. The public perceives the arms race as giving birth to an endless stream of weapons of ever-increasing destructiveness and ever-increasing danger. ... In the 1950s there was indeed a race to produce weapons of mass destruction ... Since then the arms race has been running strongly in other directions, away from weapons of mass destruction toward weapons of high precision. ... One consequence of the computer revolutions has been the replacement of big hydrogen bombs by the MIRV and the cruise missile.”

U.S. Strategic Bombing Survey: THE EFFECTS OF THE ATOMIC BOMBINGS OF HIROSHIMA AND NAGASAKI, 19 June 1946

P. 7:

“A single atomic bomb, the first weapon of its type ever used against a target, exploded over the city of Hiroshima at 0815 on the morning of 6 August 1945. Most of the industrial workers had already reported to work, but many workers were enroute and nearly all the school children and some industrial employees were at work in the open on the program of building removal to provide firebreaks and disperse valuables to the country. The attack came 45 minutes after the “all clear” had been sounded from a previous alert. Because of the lack of warning and the populace’s indifference to small groups of planes, the explosion came as an almost complete surprise, and the people had not taken shelter. Many were caught in the open, and most of the rest in flimsily constructed homes or commercial establishments.

PP 7-8:

“From the Nagasaki Prefectural Report on the bombing, something of the shock of the explosion can be inferred: “Previously, a general alert had been sounded at 0748, with a raid alert at 0750; this was cancelled at 0830, and the alertness of the people was dissipated by a great feeling of relief. The city remained on the warning alert, but when two B-29’s were again sighted coming in the raid signal was not given immediately; the bomb was dropped at 1102 and the raid signal was given a few minutes later, at 1109.”

P. 9:

“In Hiroshima (and in Nagasaki also) the dwellings were of wood construction; about one-half were one story and the remainder either one and one-half or two stories. ... The type of construction, coupled with antiquated fire-fighting equipment and inadequately trained personnel, afforded even in peacetime a high possibility of conflagration. Many wood framed industrial buildings were of poor construction by American standards. The principal points of weakness were the extremely small tendons, the inadequate tension joints, and the inadequate or poorly designed lateral bracings. Reinforced concrete framed buildings showed a striking lack of uniformity in design and in quality of materials. Some of the construction details (reinforcing rod splices, for example) were often poor, and much of the concrete was definitely weak...

pp 12-13:

“The bulk of the city’s output came from large plants located on the outskirts of the city: one-half of the industrial production came from only five firms. Of these larger companies, only one suffered more than superficial damage. Of their working force, 94 percent were uninjured. Since electric power was available, and materials and working force were not destroyed, plants ordinarily responsible for nearly three-fourths of Hiroshima’s industrial production could have resumed normal operation within 30 days of the attack had the war continued. Immediately after the attack, the presence of these nearly intact industries spurred counter-measures in an effort to retain for the nation’s war effort the potential output of the city. The prefectural governor issued a proclamation on 7 August, calling for “a rehabilitation of the stricken city and an aroused fighting spirit to exterminate the devilish Americans”. To prevent the spread of rumors and brace morale, 210,000 out-of-town newspapers were brought in daily to replace the destroyed local paper. On 16 August, regular rationing was resumed. Care of the injured and disposal of corpses remained urgent, but other steps were few. By 1 November, the population of Hiroshima was back to 137,000. ... The official Japanese figures summed up the building destruction at 62,000 out of a total of 90,000 buildings in the urban area, or 69%. An additional 6,000 or 6.6% were severely damaged, and most of the others showed glass breakage or disturbance of roof tile. These figures show the magnitude of the problem facing the survivors. Despite the absence of sanitation measures, no epidemics are reported to have broken out. ...”

P. 16 (NAGASAKI):

“Because parts of the city were protected by hills, more than one-half of the residential units escaped serious damage. Of the 52,000 residential units in the city on 1 August, 14,146 or 27.2 percent were completely destroyed (by Japanese count) (11,494 of these were burned); 5,441 or 10.5 percent were half-burned or destroyed; many of the remaining units suffered superficial or minor damage.”

P. 20: “Uninfected burns healed promptly without any unusual clinical features, according to the Japanese physicians who attended the cases. American medical observers noted only a tendency to formation of excess scar tissue, which could be satisfactorily explained as the result of malnutrition and the large degree of secondary infection that complicated healing of the burns. ... In many instances, these primary burns of minor nature were completely healed before patients developed evidence of radiation effects. Because of the brief duration of the flash wave and the shielding effects of almost any objects - leaves and clothing as well as buildings - there were many interesting cases of protection. The radiant heat came in a direct line like light, so that the area burned corresponded to this directed exposure.”

United States Strategic Bombing Survey: Summary Report (Pacific War), 1 JULY 1946, pp. 1-27:

“The orientation of the Japanese economy toward war began in 1928, and continued with increasing emphasis during the Manchurian and Chinese campaigns. By 1940 ... 17 percent of Japan's total output was being devoted to direct war purposes and expansion of her munition industries, as against 2.6 percent at

that time in the United States. ... Coal production in Japan rose from 28,000,000 tons in 1931 to 55,600,000 tons in 1941. ... Output of aluminum ingots had risen from 19 tons in 1933 to 71,740 in 1941, 90 percent of which was produced from bauxite imported from the Dutch East Indies. ... By the end of 1941, bauxite stocks of 250,000 tons, constituting a 7 months' supply, and 43,000,000 barrels of oil and oil products were stored in Japan. ... The share of the gross national product devoted to direct war and munitions expenditures increased from 23 percent in 1941 to 31 percent in 1942, 42 percent in 1943 and 52 percent in 1944. In 1944, half of the remaining national product was accounted for by food. In 1943, however, the United States was devoting 45 percent of its vastly greater national product to direct war purposes. ...Aircraft production of all types, including training planes, was stepped up from 700 planes per month in the summer of 1942 to 2,572 planes in September 1944. ...Construction of merchant ships increased from approximately 238,000 tons in 1941, to 1,600,000 tons of steel ships and 254,000 tons of wooden ships in 1944. ...

“The total tonnage of bombs dropped by Allied planes in the Pacific war was 656,400. Of this, 160,800 tons, or 24 percent, were dropped on the home islands of Japan. Navy aircraft accounted for 6,800 tons, Army aircraft other than B-29s for 7,000 tons, and the B-29s for 147,000 tons. By contrast, the total bomb tonnage in the European theater was 2,700,000 tons of which 1,360,000 tons were dropped within Germany's own borders. ...

“On 9 March 1945, a basic revision in the method of B-29 attack was instituted. It was decided to bomb the four principal Japanese cities at night from altitudes averaging 7,000 feet. Japanese weakness in night fighters and antiaircraft made this program feasible. Incendiaries were used instead of high-explosive bombs and the lower altitude permitted a substantial increase in bomb load per plane. One thousand six hundred and sixty-seven tons of bombs were dropped on Tokyo in the first attack. The chosen areas were saturated. Fifteen square miles of Tokyo's most densely populated area were burned to the ground. The weight and intensity of this attack caught the Japanese by surprise. No subsequent urban area attack was equally destructive. Two days later, an attack of similar magnitude on Nagoya destroyed 2 square miles. In a period of 10 days starting 9 March, a total of 1,595 sorties delivered 9,373 tons of bombs against Tokyo, Nagoya, Osake, and Kobe destroying 31 square miles of those cities at a cost of 22 airplanes. The generally destructive effect of incendiary attacks against Japanese cities had been demonstrated. ...

“In the aggregate, 104,000 tons of bombs were directed at 66 urban areas. ... The physical destruction resulting from the air attack on Japan approximates that suffered by Germany, even though the tonnage of bombs dropped was far smaller. ... In the aggregate some 40 percent of the built-up area of the 66 cities attacked was destroyed. Approximately 30 percent of the entire urban population of Japan lost their homes and many of their possessions. ... Trains were running through Hiroshima 48 hours after the dropping of the atomic bomb on that city. Damage to local transport facilities, however, seriously disrupted the movement of supplies within and between cities, thereby hindering production, repair work and dispersal operations. ...

“Total civilian casualties in Japan, as a result of 9 months of air attack, including those from the atomic bombs, were approximately 806,000. Of these, approximately 330,000 were fatalities. These casualties probably exceeded Japan's combat casualties which the Japanese estimate as having totaled approximately 780,000 during the entire war. The principal cause of civilian death or injury was burns. Of the total casualties approximately 185,000 were suffered in the initial attack on Tokyo of 9 March 1945. Casualties in many extremely destructive attacks were comparatively low. Yokahoma, a city of 900,000 population, was 47 percent destroyed in a single attack lasting less than an hour. The fatalities suffered were less than 5,000.

“The Japanese had constructed extensive firebreaks by tearing down all houses along selected streets or natural barriers. The total number of buildings torn down in this program, as reported by the Japanese, amounted to 615,000 as against 2,510,000 destroyed by the air attacks themselves. These firebreaks did

not effectively stop the spread of fire, as incendiaries were dropped on both sides of the breaks. They did, however, constitute avenues of escape for the civilian population.

“The growing food shortage was the principal factor affecting the health and vigor of the Japanese people. Prior to Pearl Harbor the average per capita caloric intake of the Japanese people was about 2,000 calories as against 3,400 in the United States. The acreage of arable land in Japan is only 3 percent of that of the United States to support a population over half as large. In order to provide the prewar diet, this arable acreage was more intensively cultivated, using more manpower and larger quantities of fertilizer than in any other country in the world; fishing was developed into a major industry; and rice, soybeans and other foodstuffs amounting to 19 percent of the caloric intake were imported. Despite the rationing of food beginning in April 1941 the food situation became critical. ... By 1944, the average per capita caloric intake had declined to approximately 1,900 calories. By the summer of 1945 it was about 1,680 calories per capita. ... Undernourishment produced a major increase in the incidence of beriberi and tuberculosis. ...

“The Japanese people reacted to news of the attack against the United States and its Allies with mingled feelings of fear, insecurity and hope. To a people wearied by 10 years of war in China, it was clear that this would be a major war ... By December 1944 air attacks from the Marianas against the home islands had begun, defeats in the Philippines had been suffered, and the food situation had deteriorated; 10 percent of the people believed Japan could not achieve victory. By March 1945, when the night incendiary attacks began and the food ration was reduced, this percentage had risen to 19 percent. In June it was 46 percent, and just prior to surrender, 68 percent. Of those who had come to this belief over one-half attributed the principal cause to air attacks, other than the atomic bombing attacks, and one-third to military defeats. ...

“On 6 August and 9 August 1945, the first two atomic bombs to be used for military purposes were dropped on Hiroshima and Nagasaki respectively. ... Clothing ignited, though it could be quickly beaten out, telephone poles charred, thatch-roofed houses caught fire. ... Nothing was vaporized or disintegrated; vegetation is growing again immediately under the center of the explosions; there are no indications that radio-activity continued after the explosion to a sufficient degree to harm human beings. ... numerous fires started, a few from the direct heat of the dash, but most from overturned charcoal cooking stoves or other secondary causes.

“The Survey has estimated that the damage and casualties caused at Hiroshima by the one atomic bomb dropped from a single plane would have required 220 B-29s carrying 1,200 tons of incendiary bombs, 400 tons of high explosive bombs, and 500 tons of anti-personnel fragmentation bombs, if conventional weapons, rather than an atomic bomb, had been used. One hundred and twenty-five B-29s carrying 1,200 tons of bombs would have been required to approximate the damage and casualties at Nagasaki. ...

“On 6 August the atomic bomb was dropped on Hiroshima, and on 9 August Russia entered the war. ... By using the urgency brought about through fear of further atomic bombing attacks, the Prime Minister found it possible to bring the Emperor directly into the discussions of the Potsdam terms. Hirohito, acting as arbiter, resolved the conflict in favor of unconditional surrender. ... Military defeats in the air, at sea and on the land, destruction of shipping by submarines and by air, and direct air attack with conventional as well as atomic bombs, all contributed to this accomplishment. ... Based on a detailed investigation of all the facts, and supported by the testimony of the surviving Japanese leaders involved, it is the Survey's opinion that certainly prior to 31 December 1945, and in all probability prior to 1 November 1945, Japan would have surrendered even if the atomic bombs had not been dropped, even if Russia had not entered the war, and even if no invasion had been planned or contemplated.”

- United States Strategic Bombing Survey: Summary Report (Pacific War), 1 JULY 1946, pp. 1-27.

"A lack of knowledge of modern war and of our defense gives rise to unrealistic ideas which may take on

fantastic proportions and cause reactions of terror and anxiety. ... Ignorance may be combatted by obtaining in peacetime information about modern means of making war and about our defense. ... The more knowledge we have about something, the less we need to grope in supposition and misunderstanding ... We should try to obtain a conception about the ways modern weapons operate - their possibilities, but also their limitations. ... We don't hesitate to read about the diseases of the human body in order to obtain knowledge and find cures. ... It does not pay to stick our heads in the sand and say that somebody else will have to take care of that. Our generation, which has survived two world wars and is now trying to survive the current cold war, is clearly destined to have war or the threat of war always with us. ... It is urgent that we do not jell into stereotypical thinking and that we try to arrive at our own opinions. There is a dangerous tendency to simplify the problems ..."

- Dr Walo von Greyerz, Psychology of Survival: Human reactions to the catastrophes of war, Elsevier, New York, 1962, pp 73-74 and 89-90.

“Ever since the first atomic bomb exploded over Hiroshima, millions and millions of words have been … written … [claiming] that a war fought with these weapons will result in the sudden extinction of civilisation. The historian, of course, knows better. He knows that few civilisations and few nations have been wiped out by mechanical means. Civilisations and nations die, as a rule, from a disease of the soul, a paralysis of the spiritual force that gave them birth and sustained their growth.”

- Australian Army Journal, Editorial, October-November 1949.

“If a man reads or hears a criticism of anything in which he has an interest, watch whether his first question is as to its fairness and truth. If he reacts to any such criticism with strong emotion; if he bases his complaint on the ground that it is not in ‘good taste,’ or that it will have a bad effect - in short, if he shows concern with any question except ‘is it true?’ he thereby reveals that his own attitude is unscientific. Likewise if in his turn he judges an idea not on its merits but with reference to the author of it; if he criticizes it as ‘heresy’; if he argues that authority must be right because it is authority; if he takes a particular criticism as a general depreciation; if he confuses opinion with facts; if he claims that any expression of opinion is ‘unquestionable’; if he declares that something will ‘never’ come about, or it is ‘certain’ that any view is right. The path of truth is paved with critical doubt, and lighted by the spirit of objective enquiry... the majority of people have resented what seems in retrospect to have been purely matter of fact ... nothing has aided the persistence of falsehood, and the evils resulting from it, more than the unwillingness of good people to admit the truth ... the tendency continues to be shocked by natural comment, and to hold certain things too ‘sacred’ to think about. ... How rarely does one meet anyone whose first reaction to anything is to ask: ‘is it true?’ Yet, unless that is a man’s natural reaction, it shows that truth is not uppermost in his mind, and unless it is, true progress is unlikely.”

- Sir Basil Henry Liddell Hart, Why Don’t We Learn from History?, PEN Books, 1944; revised edition, Allen and Unwin, 1972.

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Reviewer: jayessell - ★★★★★ - August 13, 2018
Subject: Huge file should have been several documents.
Great for history buffs and those wanting to know about the effects of nuclear weapons.
However...
This PDF contains documents from the 1940s up to 2007.
Some documents are British referencing the incendiary bombs used by Germany.
Yes, those are interesting also but as I said this should have been several files.
After a brief skim of the document I haven't really seen a reference to radiation other than heat flash. I'm sure the 1960s documents reference it.

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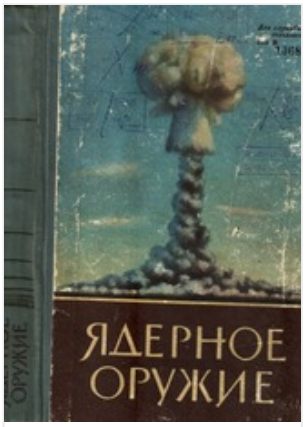

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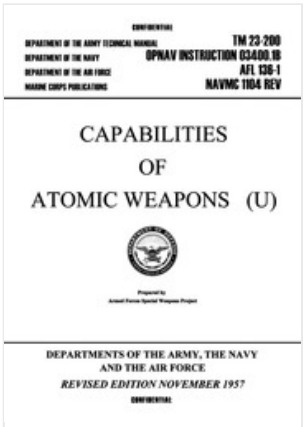

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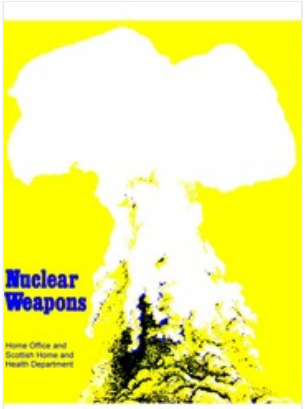

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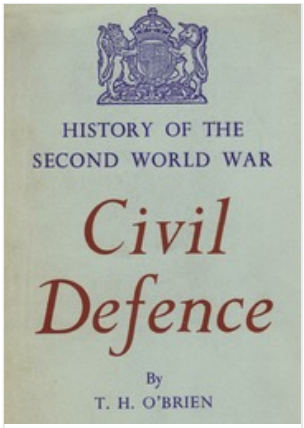

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